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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/708,164	02/12/2004	Daniel J. Weyers	142200NM (GEMS0235PA)	2163
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PETER VOGEL GE HEALTHCARE 20225 WATER TOWER BLVD. MAIL STOP W492 BROOKFIELD, WI 53045				
EXAMINER				
WEATHERBY, ELLSWORTH				
ART UNIT		PAPER NUMBER		
3768				
MAIL DATE		DELIVERY MODE		
08/18/2010		PAPER		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/708,164

Applicant(s)

WEYERS ET AL.

Examiner

ELLSWORTH WEATHERBY

Art Unit

3768

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-23 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/CD)
Paper No(s)/Mail Date ____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date ____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: ____

DETAILED ACTION

Claim Objections

1. Claims 1 and 10 are objected to because of the following informalities:

Regarding claim 1, the limitation "a thermal energy transfer device reducing temperature of a cooling fluid within the radio frequency space cooling system" should read *a thermal energy transfer device configured for reducing a temperature of a cooling fluid within the radio frequency space cooling system*. Regarding claim 10, it is not made clear by the claim language whether or not the input is directly connected to an output or if the input is coupled to cooling elements which are connected to the output. Appropriate correction is required.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 11 and 16 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Regarding claim 11, it is impossible to determine the metes and bounds of the claim limitation "a significant length". Regarding claim 16, the claimed subject matter, "said active cooling system preventing thermal energy transfer between the gradient coil assembly and the RF coil" does not include the necessary structural limitations to achieve the claimed function. Accordingly, it assumed that a

cooling element for cooling an RF or gradient coil would inherently prevent at least some thermal energy transfer.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1, 3-4, 11, 14-19, 21-23 are rejected under 35 U.S.C. 102(b) as being anticipated by Dean et al. (Pub. No. 2002/0073717).

6. Dean et al. '717 (hereinafter Dean) teaches a radio frequency (hereinafter RF) space cooling system for a magnetic resonance imager system (Abstract; Figs. 1-8), comprising: A thermal energy transfer device reducing a temperature of a cooling fluid within the RF space cooling system (ref. 22; 0027; 0042); and at least one cooling element coupled to the thermal energy transfer device and extending along a patient bore between a RF shield and a RF coil of the magnetic resonance imager system (0027; 0029; 0041-0042; 0058), said at least one cooling element having at least one channel for passage of the cooling fluid (0058). Dean also teaches that the at least one cooling element comprises a plurality of cooling elements that are coupled in series (0045; 0059). Dean also teaches that the at least one cooling element comprises a plurality of cooling elements that are coupled in a serpentine manner (See Figs. 6-7).

Dean et al. '717 also teaches that the system comprises an input and an output non-conductively coupled to the input with a single continuous channel (0056; Figs. 2-4). Dean also teaches that the at least one cooling element extends across a significant length and along a z-axis of the patient bore (Fig. 1). Dean also teaches that the RF shield is coupled into the gradient coil assembly (Fig. 1, refs. 30 & 140).

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claim 5-10 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dean et al. (Pub. No. 2002/0073717) in view of DeMeester et al. (USPN 5,280,247).

9. The RF space cooling system for MRI system of Dean teaches all the limitations of the claimed invention except for expressly teaching that the at least one cooling element is formed at least partially of a conductive material selected from at least one of copper and stainless steel. Dean also does not expressly teach the use of a plurality of extension members. Dean et al. provides u shaped coupling between different portions of the cooling elements (Figs. Figs. 6-7). However, Dean does not expressly teach that the coupling members are non-conductive.

10. In a related field of endeavor, DeMeester et al. (hereinafter DeMeester) teaches a filamentary cold shield for superconducting magnets (Abstract; Figs. 1-6). Here, DeMeester teaches the use of electrically insulative conductive copper or aluminum on at least one surface of the cold shield (col. 4, ll. 3-10). DeMeester also teaches using the copper on a plurality of extension members (col. 4, ll. 8-10). DeMeester also teaches the use of U shaped coupling members (Figs. 3-6).

11. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the RF space cooling system of Dean in view of the use of copper for a MR cooling system of DeMeester. The motivation to modify Dean in view of DeMeester would have been to use a highly thermally conductive material to improve heat transfer, as is known in the art.

12. Claims 12-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dean et al. (Pub. No. 2002/0073717) in view of Clarke et al. (USPN 7,015,692).

13. The RF space cooling system for MRI system of Dean teaches all the limitations of the claimed invention except for expressly teaching that the at least one cooling element extends parallel to at least one rung of the RF coil. Dean also does not expressly teach that the at least one cooling element extends over end-rings of the radiofrequency coil.

14. In the same field of endeavor, Clarke et al. (hereinafter Clarke) teaches an apparatus for active cooling of an MRI patient bore in cylindrical MRI systems (Abstract; Figs. 1-7). Here, Clarke provides a plurality of configurations of cooling elements (Figs.

3-6). Clarke does not expressly teach that the variety of coil cooling elements are parallel to at least one rung of the RF coil. However, the Examiner stands that the multitude of known RF coil designs would include coils that are parallel to the known cooling element design of Clarke.

15. It would have been obvious to one of ordinary skill in the art to modify the RF space cooling system for an MRI system of Dean with the cooling element configurations of Clarke. The motivation to modify Dean in view of Clarke would have been to provide known cooling element designs to effectively cool an RF element, as is well known in the art.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ELLSWORTH WEATHERBY whose telephone number is (571) 272-2248. The examiner can normally be reached on M-F 8:30 a.m. - 5:00 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Long Le can be reached on (571) 272-0823. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/EW/

/Long V Le/
Supervisory Patent Examiner, Art Unit 3768